Integrated tapered active modulators for high efficiency Gbps PPM laser transmitter PICs

Completed Technology Project (2016 - 2019)

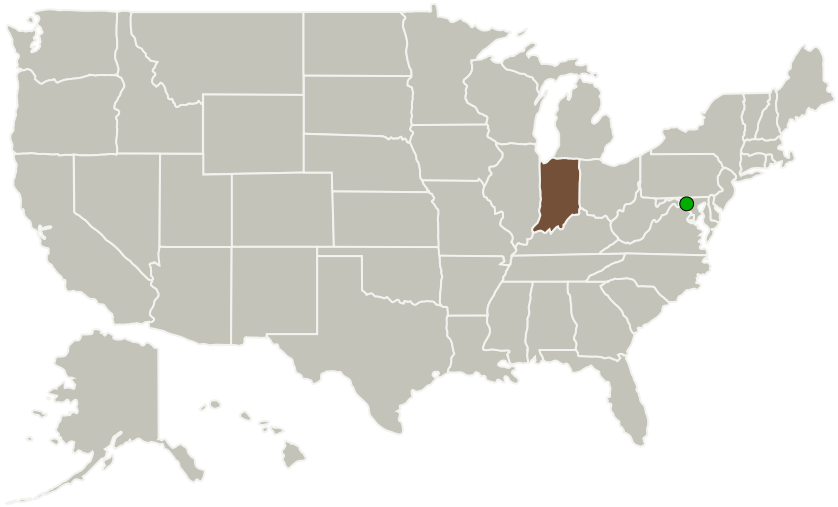
Project Introduction

Modern satellites must be able to transfer large amounts of data at very high speeds. Free-space optical communication using laser sources offers the fastest possible bandwidth for these systems, making it an attractive solution for the future. The laser transmitter must be compact, lightweight, power efficient, reliable, and hardened against the harsh environment of space. Researchers at Rose-Hulman Institute of Technology and Freedom Photonics, LLC will develop a high-efficiency photonic integrated circuit (PIC) platform based on the highly reliable InGaAsP material system. The tapered active amplifier design under development is expected to enable Watt-class laser transmitter PICs capable of >100 Gbps data rates.

Anticipated Benefits

Free-space optical communication using laser sources offers the fastest possible bandwidth for these systems, making it an attractive solution for the future. The tapered active amplifier design under development is expected to enable Watt-class laser transmitter PICs capable of >100 Gbps data rates.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Rose-Hulman Institute of Technology	Lead Organization	Academia	Terre Haute, Indiana
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations
Indiana

Project Website:

https://www.nasa.gov/strg#.VQb6T0jJzyE

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Rose-Hulman Institute of Technology

Responsible Program:

Space Technology Research Grants

Project Management

Program Director:

Claudia M Meyer

Program Manager:

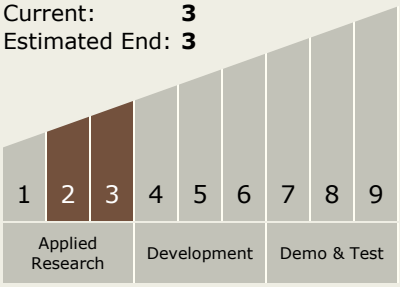
Hung D Nguyen

Principal Investigator:

Scott Kirkpatrick

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.1 Optical Communications
    - TX05.1.3 Lasers

Target Destination

Earth